

**REMARKS**

Applicant respectfully requests reconsideration and allowance of subject application. Claims 11-14, 25-28 and 44-47 are canceled in this Response without prejudice or disclaimer of the subject matter recited in the claims. Claims 1, 3-5, 7-9, 15, 17-19, 21-23, 29-31, 34-36, 39-41, 48-50, 53-55, 58-60, 63 and 65 are amended in this Response. Claims 1, 7-9, 15, 21-23, 63 and 65 are independent claims. Accordingly, claims 1-5, 7-10, 15-19, 21-24, 29-43 and 48-66 remain pending.

Applicant thanks the Examiner for the detailed analysis presented in the current Office Action.

**Interview**

Applicant thanks the Examiner for the interview afforded to the Applicant's representative on August 15, 2005. The current rejections under 35 U.S.C. §§ 112 & 103 were discussed during the interview. The Applicant agreed to amend the claims to clarify that a binary tree is being *created* by way of the various methods recited by the claims. To that end, Applicant has amended various claims pending in the present Application to set forth that descendent nodes are *created* in the binary tree as the structure of the tree is built.

Applicant further agreed to amend the claims to further define the claims of the present Application over the art relied upon the Office. In particular, Applicant has amended various claims pending in the present Application to set forth that an ordered list includes "at least four elements." Moreover, various claims have been amended to recite that elements are separated into particular

1 groupings "based on whether the list has an even or odd number elements." The  
2 Office is specifically directed to independent claims 1, 7-9, 15, 21-23, 63 and 65.

3 Applicant agreed to amend the claims of the present Application for the  
4 sole purpose of expediting the prosecution of the Application.

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6 Claim Rejection Under 35 U.S.C. § 112

7 Claims 1-5, 7-19 and 21-66 stand rejected under 35 U.S.C. § 112, second  
8 paragraph, as being indefinite for failing to particularly point out and distinctly  
9 claim the subject matter which the Applicant regards as the invention. Applicant  
10 traverses this rejection.

11 The Office was particularly concerned with the "inserting" subject matter  
12 of the rejected claims. In the current Office Action, the Office states it is "not  
13 clear how a binary tree is inserted from the median." The claims of the present  
14 Application are directed to "creating a binary tree" from "an ordered list of at least  
15 four elements." The tree is built by creating left and right side descendent nodes,  
16 not necessarily in the given order, by successively finding medians of respective  
17 left and right element groupings and linking the found medians to previous  
18 medians. Applicant respectfully submits that the subject matter of the claims, as  
19 amended, sets forth in a definite manner the method in which a binary tree is  
20 created.

21 Accordingly, reconsideration and withdraw of the 35 U.S.C. § 112 rejection  
22 are requested.

1 *Claim Rejection Under 35 U.S.C. § 103*

2 Claims 1-5, 7-19 and 21-66 are rejected under 35 U.S.C. 103(a) as being  
3 unpatentable over "Introduction to Algorithms" by Cormen, Leiserson and Rivest  
4 (hereinafter "CLR") in view of "Indexing Large Metric Spaces for Similarity  
5 Search Queries" by Bozkaya and Tolga (hereinafter "BT"). The rejection is  
6 respectfully traversed.

7 Each of the independent claims of the present Application recite "creating a  
8 binary tree data structure...from an ordered list of at least four elements," where  
9 the method includes "determining whether the list has an even or odd number of  
10 elements," and separating or determining a "parent node" or "parent element" is  
11 determined "based on whether the list has an even or odd number of elements."  
12 The "parent node" or "parent element" separate left and right side "groupings."  
13 The claims further recite "creating" left and right "side descendent nodes" once  
14 the left and right side groups are found. In creating the left and right side nodes,  
15 medians of each of the left and right side groups are linked to previous medians.  
16 (*See claims 1, 7-9, 15, 21-23, 63 and 65 specifically.*)

17 Applicant respectfully submits, for the following reasons, that the  
18 combination of CLR and BT fails to teach or suggest the limitations of the claims  
19 currently pending in the present Application. The CLR document teaches the  
20 broad ideas of searching and creating a binary search tree, which the CLR  
21 document often refers to as "B-trees." The Office recognizes the CLR document  
22 does not teach the specifics of the binary tree data structure method of the present  
23 claims. The Office alleges BT remedies the deficiencies of the CLR document.  
24 Applicant disagrees with this assertion.  
25

1 BT teaches the concept of creating a binary vantage-point (vp) tree.  
2 According to the BT document, the binary vp-tree is created using a distance  
3 metric that chooses an arbitrary vantage point from a group of objects as a parent  
4 node.

5 The *arbitrary* choice of a parent node according to BT is fundamentally  
6 different than the methods set forth in the claims of the present Application.  
7 Because the parent node of BT is chosen *arbitrarily*, it is clear BT does not/would  
8 not teach or suggest separating the list of elements "based on whether the list has  
9 an even or odd number of element." Here, the separated list is defined by "a  
10 median of the list, wherein the median is a left element of two middle values of the  
11 list when the list has an even number of elements, or the median is a middle value  
12 element of the list when the list has an odd number of elements." (*See claims 1, 7-*  
13 *9, 15, 21-23, 63 and 65 specifically.*)

14 In addition to the above, the combination of CLR and BT fails to teach or  
15 suggest the limitations of the claims currently pending in the present Application  
16 for the following reasons. Each of the rejected independent claims recites that "a  
17 binary tree data structure" is created "from an ordered list of at least four  
18 elements." Assuming CLR and BT would arbitrarily pick the same parent node as  
19 the methods set forth in the claims of the present Application, the resulting tree  
20 would nevertheless be structured differently than a binary tree structure created by  
21 an implementation of the present Application.

22 For example, let an ordered set equal  $S = (1,2,3,4)$ . Using the CLR and BT  
23 technique, assume an *arbitrary* vantage point is selected as  $S_v=2$ . This *arbitrary*  
24 vantage point happens to correspond to the parent node an implementation of the  
25 present Application would select. According to CLR and BT, M is now calculated

1 as the median distances of all set members from  $S_v$ . In particular, for the set  $S$ , the  
2 set of distances  $D = d(S_v, S_i)$ . In this case,  $D = (1,1,2)$ , where  $d(2,1) = 1$ ,  $d(2,3) =$   
3  $1$ , and  $d(2,4) = 2$ . Deferring to the left, 1 is the median ( $M$ ) of those distances.

4 Now, the remainder of the set is divided into a left set  $S_l$  and a right set  $S_r$ ,  
5 based on a distance from the *arbitrary* vantage point  $S_v$ . If a set member is less  
6 than or equal to  $M$ , it is placed in  $S_l$ , and if a set member is greater than or equal  
7  $M$ , it is placed in  $S_r$ . The resulting sets would be  $S_l = (1,3)$  and  $S_r = (4)$ . The  
8 number 4 must be placed in  $S_r$  to avoid an unbalanced tree. The alternative would  
9 be to place 4 in group  $S_l$ , which would be contrary to the purpose of creating a  
10 binary vp-tree that is balanced.

11 The groups  $S_l = (1,3)$  and  $S_r = (4)$  will not result using an implementation  
12 of the present invention. Assume again that the set is  $S = (1,2,3,4)$ . According to  
13 an implementation of the present Application, 2 is the parent node. Based on the  
14 claims of the present Application, a left side grouping for set  $S$  is (1) and a right  
15 side grouping for set  $S$  is (3,4). These are not groupings that CLR and BT would  
16 find.

17 For the reasons presented above, Applicant respectfully submits claims 1,  
18 7-9, 15, 21-23, 63 and 65 are at least allowable over CLR in view of BT. The  
19 remaining dependent claims are allowable by virtue of their dependency on one of  
20 the discussed independent claims.  
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**Conclusion**

Claims 1-5, 7-10, 15-19, 21-24, 29-43 and 48-66 are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of the subject application. If any issue remains unresolved that would prevent allowance of this case, the Examiner is requested to urgently contact the undersigned attorney to resolve the issue.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 12-0769 for any additional fees required under 37 CFR §1.16 or under §1.17; particularly, extension of time fees.

Respectfully Submitted,

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